

Deciding the embedding nonlinear model dimensions and data size prior to daily reference evapotranspiration modelling

ABSTRACT

Evapotranspiration is an integral part of the hydrologic cycle and an important component in water resource development and management. It is difficult to obtain an accurate formula for ETO estimation that is suitable to encompass all environments, because evapotranspiration is an incidental, nonlinear, complex and unsteady process. Soft computing models are able to handle noisy data from a dynamic and nonlinear system such as the evapotranspiration process. But, they do not have the ability of pre-processing before model development. In this study, the Gamma Test (GT) technique is applied to find the best input combination and number of sufficient data points for evapotranspiration modeling under humid and arid conditions. It was found that the minimum required variables to construct a good nonlinear model under arid conditions are the minimum and maximum air temperature and wind speed data. For humid conditions the minimum and maximum air temperature, solar radiation and mean relative humidity are the most effective variables.

Keyword: ANFIS model; Empirical formula; Evapotranspiration